AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A method of up-converting a modulated IF signal to an assigned one of a plurality of RF channels, each of the channels comprising a channel frequency band, said method comprising ~~the step of~~:

amplifying the power level of the IF signal with a gain;

mixing the IF signal with a local oscillator circuit to produce an RF output signal falling ~~with~~ within the channel frequency range of the assigned RF channel; and

attenuating the RF output signal by a factor substantially equal to ~~the~~ said gain by adjusting said power level of said IF signal and a level of said RF output signal to produce a desired trade-off between a signal-to-noise ratio and a signal-to-distortion ratio of said RF output signal while maintaining a desired constant level of said RF output signal.

2. (Currently Amended) The method of Claim 1, further comprising ~~the step of~~ filtering one or more distortion components from the RF output signal.

3. (Currently Amended) The method of Claim 2, wherein the gain is nominal whenever at least one of the one or more distortion components [[is]] cannot be filtered.

4. (New) A method of optimizing frequency conversion, comprising:

receiving an input signal having a first frequency;

controlling a level of said input signal;

receiving a local oscillator signal having a second frequency;

converting said first frequency into a third frequency by mixing said input signal with said local oscillator signal to generate an output signal having said third frequency;

controlling a level of said output signal; and

adjusting said level of said input signal and said level of said output signal to produce a desired trade-off between a signal-to-noise ratio and a signal-to-distortion ratio of said output signal while maintaining a desired constant level of said output signal.

5. (New) A method of optimizing frequency conversion, comprising:

receiving an input signal having a first frequency;

controlling a level of said input signal;

receiving a local oscillator signal having a second frequency;

converting said first frequency into a third frequency by mixing said input signal with said local oscillator signal to generate an output signal having said third frequency;

controlling a level of said output signal;

tuning said third frequency of said output signal to one frequency value selected from a set of desired frequency values by tuning said second frequency of said local oscillator signal to a corresponding frequency value;

determining a desired trade-off between a signal to noise ratio and a signal to distortion ratio of said output signal for each one of said set of desired frequency values;

achieving said desired trade-off between the signal-to-noise ratio and the signal-to-distortion ratio of said output signal for each one of said frequency values of said output signal by controlling said input signal level and said output signal level while maintaining a desired constant level of said output signal.

6. (New) The method of claim 5, wherein said converting includes a frequency down-conversion of a modulated input IF signal to an assigned one of a plurality of RF output channels.

7. (New) The method of claim 6, further comprising:

filtering one or more distortion components from at least one of said plurality of assigned RF output channels.

8. (New) The method of claim 7, wherein said achieving further comprises:

maintaining a constant desired output RF signal level by adjusting said assigned one of said plurality of output RF channels while increasing a level of said modulated input IF signal by adjusting said level of said modulated IF input level to an extent not exceeding specification requirements set for said signal-to-distortion ratio of said output RF signal.

9. (New) The method of claim 8, wherein said maintaining further comprises:

combining variable attenuation, and variable or fixed amplification of each of said IF signal and RF channel.

10. (New) The method of claim 9, wherein said combining further comprises:

optimizing exchange rate coefficients on a channel-by-channel basis; and

programming said coefficients in non-volatile memory utilizing a controller.

11. (New) A frequency converter device, comprising:

a first signal input that receives an input signal having a first frequency;

a first controller for controlling a level of said signal input;

a second signal input that receives a local oscillator signal having a second frequency;

a converter for providing a third frequency using a mixer for combining said input signal with said local oscillator signal to generate an output signal having said third frequency;

a second controller for controlling a level of said output signal;

a filter for separating one or more distortion components from the output signal; and

an amplifier for adjusting said level of said input signal and said level of said output signal to produce a desired trade-off between a signal-to-noise ratio and a signal-to-distortion ratio of said output signal while maintaining a desired constant level of said output signal.

12. (New) A method of optimized frequency conversion for generating a broadband composite signal having a plurality of RF channels, each of the plurality of RF channels including a unique subset of a contiguous range of channel frequencies, the method comprising:

assigning each of a plurality of modulation signals to each of the plurality of RF channels, each of the modulation signals having at least one frequency component and a first frequency;

converting the at least one frequency component from said first frequency to a third frequency wherein the third frequency is contained within the subset of channel frequencies corresponding to the RF channel to which each modulation signal is assigned, the converting further comprising:

mixing said plurality of modulation signals with signals having a first local signal to generate a signal having a second frequency;

amplifying a level of said signal having said second frequency;

mixing said amplified signal with a second local signal to generate a converted output having a frequency component equal to said third frequency;

attenuating said converted output for each of the plurality of modulation signals to produce a desired trade-off between a signal-to-noise ratio and a signal-to-distortion ratio of said output signal while maintaining a desired constant level of said output signal; and

summing the converted outputs.

13. The method of Claim 12, wherein said attenuating of said converted output is sufficient to reverse said amplifying of said signal having said second frequency; and further comprising normalizing said converted outputs to substantially the same output level.

14. The method of Claim 13, further comprising filtering a component of said converted outputs to provide a frequency equal to about two times said third frequency.

15. The method of Claim 14, wherein said filtering further comprises providing a component of said converted outputs having a frequency equal to said second frequency minus said third frequency.

16. The method of Claim 12, wherein said amplifying and said attenuating are skipped for those modulation signals for which a distortion component having a frequency equal to said second frequency minus said third frequency cannot be filtered without affecting said converted signal.

17. (New) A frequency converter device, comprising:

a first signal input that receives an input signal having a first frequency;

a first controller for controlling a level of said input signal;

a second signal input that receives a first local oscillator signal;

a first converter for providing a second frequency using a mixer for combining said input signal with said first local oscillator signal to generate an intermediate signal having said second frequency;

a second controller for controlling a level of said intermediate signal;

a second converter for converting said second frequency of said intermediate signal to an output signal having one frequency value selected from a set of desired frequency values by attenuating said second frequency of said local oscillator signal to a corresponding frequency value;

a third controller for controlling a level of said output signal to achieve a desired trade-off between the signal-to-noise ratio and the signal-to-distortion ratio of said output signal for each one of said frequency values of said output signal,

wherein the third controller further controls said input signal level and said intermediate signal level while maintaining a desired constant level of said output signal by controlling said third controller.